Tom Pruitt

FY 1999 - FY 2000

The research will evaluate/apply recently developed nonlinear parameter estimation techniques with respect to ground water modeling. Software employing this method is now available to automate the model calibration process using inverse modeling. Ground water flow and transport models were developed in the early 1990s for the Equus beds aquifer in southeastern
Kansas. Data supporting these models are extensive, and the models were manually calibrated (reference reports). The Equus beds aquifer is the primary source of water for municipal, industrial, agricultural, and domestic uses between Hutchinson and Wichita, Kansas. Subsequent management of this aquifer has largely been based on the results from these models. Application of nonlinear parameter estimation techniques to these existing models will provide a measure of and possible improvement to the accuracy of model results - in turn, management decisions regarding the resource, based on these models, can be made with more confidence. The parameter estimation techniques investigated/evaluated in the proposed study are universal in that they can be used with application models from any discipline.

The purpose and scope of the work effort are to evaluate the usefulness of inverse models in the process of model calibration and to demonstrate the advantages of this technique by application to existing models previously calibrated by the trial-and-error approach. In this way, the advantages and insights provided by the inverse model can be readily recognized and appreciated. Since the technique may be applied to any model, there are potentially many applications within Reclamation. Additionally, enhancement of the existing groundwater-flow and transport models will benefit local resource managers.

To be completed in FY 2000.

Equus Beds Groundwater Management District No. 2
Kansas Geological Survey